

REMARKS

After entry of this Amendment, claims 1, 2-7 and 9-36 will remain in this case.

A corrected Abstract is provided with this Amendment as requested.

Claims 32-36 have been corrected to change "installation" to "assembly" as requested.

Claims 1-3 have been rejected as anticipated by Prideaux. Claims 4-36 have been rejected over US patent number 6,058,930 to Shingleton alone or in view of the Osterwisch and Laing patents. It appears that the Osterwisch and Laing patents have not been cited by the applicant or by the Examiner on a form PTO-892.

The Claimed Invention

Claims 1-3

An example of the invention of claim numbers 1-3 is shown in **figures 19-24** and discussed in the related **paragraphs 58-60**. Paragraph 59 discusses some of the advantages accruing with this invention resulting in the following statement. "Based upon this quite unexpected result, it has been determined that the size and cost of the torque tube does not increase significantly for the tilted (Figs. 19-22) vs. horizontal (Figs. 1-18) configurations." Claim 1 has been amended to specifically clarify that the solar panels are secured to the torsion to an acute angle to the torsion tube axis with the solar panels located entirely vertically above the torsion tube axis at the noontime angular orientation.

Claims 4-36

Examples of the invention of claims 4-36 are shown in **figure 25-33** and discussed in **paragraphs 61-73**. As an aid in understanding the invention of claim 4, applicant has provided the following annotated and amended claim 4, with particular reference to figures 25 and 28.

4. (Currently amended) A tracking solar collector assembly **200** comprising:
first and second tracking solar collectors [**202 associated with Southside supports 212, 213**];
first and second Southside supports **212, 213**;
first, second and third North side supports **216, 217, 218**;
the Southside supports and the North side supports defining first and second generally parallel paths, the first and second paths being generally East-West paths, the first and second paths being

spaced apart from one another **[these east west paths are defined by a line connecting Southside supports 212, 213, 214, and by a line connecting North side supports 216, 217, 218];**

the first tracking solar collector comprising a first solar collector structure **[includes torque tube 236 and module rails 238];**

the second tracking solar collector comprising second solar collector support structure **[includes torque tube 236 and module rails 238];**

the first and second solar collector support structures each having first and second spaced apart pivotal support points **224, 232** defining a tilt axis **237**;

at least one solar collector **240** mounted to each solar collector support structure;

the first support point of each of the first and second solar collector support structures pivotally connected to and supported by the first and second Southside supports **212, 213**, respectively;

the second support point **232** of the first solar collector support structure pivotally connected to and supported by the first and second North side supports **216, 217**;

the second support point **232** of the second solar collector support structure pivotally connected to and supported by the second and third North side supports 217, 218; and

a tilting assembly comprising:

a drive element **250** secured to each solar collector support structure;

a drive element coupler **248** operably coupling the drive elements, the drive elements and the drive element coupler creating a drive assembly; and

a driver **206** coupled to the drive assembly so that operation of the driver causes the drive elements move in unison thus causing the solar collector support structures and the solar collectors therewith to tilt in unison.

The Cited Art

Prideaux discloses two basic embodiments.

- Figures 1-2B discloses a prior art embodiment including a torque tube 16 supported by a number of support posts 18. PV panels 12 are mounted to the torque tube 16 at an acute angle to the torque tube and on either side of the torque tube. Rotation of the torque tube 16 allows the PV panels 12 to track the sun.
- Figure 3-4 show PV panels 32 mounted to and below torque tube 40. Torque tube 40 is supported for rotation about a torque tube axis 38 by support posts 42. The plane of

the PV panels 32 remains parallel to axis 38 as the panels are rotated about the axis.
(4/65-68)

Shingleton, at figures 2A-2C, 9A and 10 illustrate solar tracker array 30. Each array includes a row of solar panels 34 supported by a torque tube 32 which is journaled in bearings 40 on top of piers 36. The piers 36, and therefore the row of solar panels 34, are oriented in a north/south direction. Torque tube 32 is rotated about its axis by a linear actuator 42 so that the row of solar panels 34 can be tilted from an East facing orientation (figure 2B) to a mid-day orientation (figure 2A), to a west facing orientation (figure 2C). Adjacent rows of solar panels 34 may be tilted or racked back and forth by separate actuators 62 (figure 7) or by using the same linear actuator 42 (figures 8-10) by coupling the ends of adjacent torque arms 46 to one another using link members 68.

The Cited Art Distinguished

Claim 1

The Examiner made certain statements with regard to claim 2 (now incorporated into claim 1) that are not correct. Specifically, the Examiner refers to figure 3 of Prideaux and then make certain statements regarding column 1 of Prideaux. However, those statements in column 1 refer to the prior art embodiment of figures 1-2B, not figure 3 as specified by the Examiner. Those statements are not relevant to the embodiment of figure 3.

The figure 1-2B embodiment of Prideaux does not locate PV modules entirely above the axis at any time.

They figures 3-4 embodiment of Prideaux secures the PV modules below the axis, not above, and not at an acute angle to the axis.

Accordingly, claim 1 is not anticipated by Prideaux.

It would not have been obvious to modify Prideaux to arrive at the presently claimed invention because placing PV modules 32 at an angle to torque tube 40 would be contrary to the teachings of Prideaux. Prideaux describes disadvantages of the system of figures 1-2B including "a major disadvantage with this technique is that it requires an unduly large amount of space for any given number of longitudinally spaced panels" (2/43-46) and "Another disadvantage of system 10 indirectly results from the large spacing requirement between adjacent panels." (2/57-59) Prideaux teaches against placing PV panels 32 and an acute angle to the axis to prevent shading (3/10-15). Rather, Prideaux teaches placing the panels end-to-end, not tilted relative to the tilt axis. "This arrangement includes first means supporting all the panels for simultaneous rotation about a given

axis such that the solar collecting front sides of the panels are maintained in end-to-end relationship with one another within a common plane and face the same direction." (3/25-31)

Accordingly, claim 1 is allowable over Prideaux.

Claim 3

The Examiner states that figures 1 and 2A of Prideaux show mounting structure, in particular first and second plates 14 with generally triangular torsion tube portions 16 located on opposite sides of the torsion tube 16 and fasteners extending through or around the torsion tube portions. Applicant believes that the Examiner is mischaracterizing the reference. Prideaux fails to disclose how PV modules 12 are mounted to torsion tube 16. Reference number 14 is not a mounting plate but is the front side 14 of photovoltaic panel 12. There is nothing in Prideaux disclosing mounting plates with a generally triangular portion. Prideaux fails to disclose any type of fasteners.

Accordingly, claim 3 is allowable over Prideaux.

Claim 4

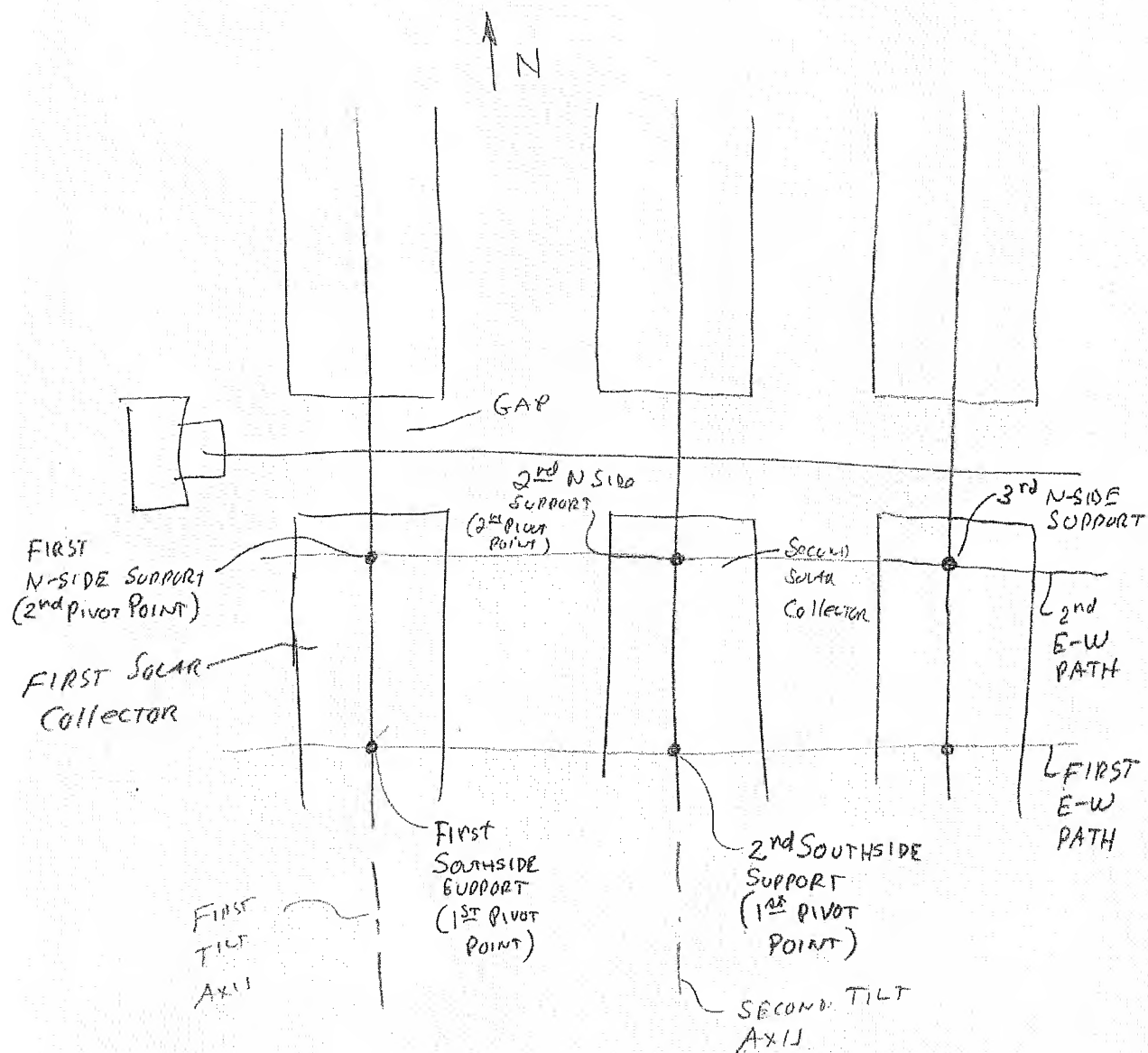
Applicant has provided the following sketch, taken from figure 9A of the Shingleton reference, as an aid in discussing how claim 4 differs from the structure disclosed in the Shingleton reference. With reference to the annotated claim 4 above and the following sketch, the Shingleton reference fails to disclose or suggest the following elements of claim 4.

the second support point **232** of the first solar collector support structure pivotally connected to and supported by the first and second North side supports **216, 217**;

The second support point of the first solar collector support structure (associated with the first solar collector) is only connected to one north side support (that is pier 36).

the second support point **232** of the second solar collector support structure pivotally connected to and supported by the second and third North side supports 217, 218;

The second support point of the second of solar collector support structure is only connected to one north side support (that is pier 36).



FROM FIG. 9A of Shingleton 6,058,930

Accordingly, claim 4 is not anticipated by Shingleton. It would not have been obvious to modify Shingleton to arrive at present invention because there is no recognition in the cited art to do so. Therefore, claim 4 is allowable over the cited art.

The dependent claims are directed to specific novel subfeatures of the invention and are allowable for that reason as well as by depending from novel parent claims. In addition to the discussion of claimed 3 about, please see the following examples.

Claims 5 and 6: figure 4A all Shingleton does not disclose a tilt axis at an angle to a horizontal; all of the tilt axes in Shingleton are horizontal.

Claim 7: element 63/64 is not a support element but rather parts of a tilt driver that changes the angular inclination of the solar panel, not the tilt axis.

Claims 14 and 15: the second North side support/upper support (36) of Shingleton is not laterally midway between the first and second tilt axes but rather is aligned with the second tilt axis.

Claims 16, 17, 19: piers 36 of Shingleton are not laterally offset but are positioned directly beneath the second tilt axis.

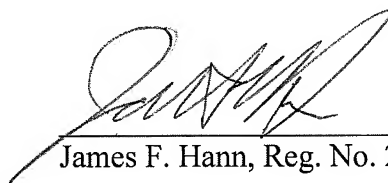
Claims 22-24: Shingleton fails to disclose or suggest that piers 36 could be anything but pier type compression members as opposed to a combination of pier type compression members and tension members (cable type or other types).

Claims 33-36: with the Shingleton, there are no laterally extending support elements aligned with any gap so that tilting does not cause the nonexistent laterally extending support elements to pass through the gap.

In light of the above remarks and the amendments to the claims, applicant submits that the application is in condition for allowance and action to that end is urged. If the Examiner believes a telephone conference would aid the prosecution of this case in any way, please call the undersigned at (650) 712-0340.

Respectfully submitted,

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